

REMARKS/ARGUMENTS

The present Amendment is responsive to the non-final Office Action mailed June 17, 2010 in the above-identified patent application.

New claims 21 and 22 are added. Therefore, claims 1-22 are the claims currently pending in the present application.

Claims 1-20 are amended to clarify features recited thereby. These amendments are fully supported by Applicant's disclosure.

Rejection of Claims 1-20 under 35 U.S.C. § 103

Claims 1-20 are rejected under 35 U.S.C. § 103 as being obvious from Brown et al., U.S. Patent No. 7,482,502 in combination with Bauer et al., U.S. Patent No. 4,342,642. Reconsideration of this rejection is respectfully requested.

The following discussion describes examples of embodiments of Applicant's claimed invention for purposes of illustration but in no way limits the scope of the claims. According to an aspect of Applicant's invention as claimed in claims 1 and 8, in a cracking furnace the feed-carrying cracking coils have inlet sections and outlet sections, and the outlet sections are thermally shielded more than the inlet sections. For example, independent claim 8 recites that the lanes of outlet sections are positioned between the lanes of inlet sections so that the outlet sections are more thermally insulated from the burners of the firebox.

As described, for example, at Specification, pages 9-14 an advantage or effect according to the thermal shielding recited in claims 1 and 8 is improved mechanical stability (Specification, page 9, starting at line 23) and/or improved thermal stability (Specification, page 11, lines 27-28), and/or increased cracking capacity for firebox volume (Specification, page 11, lines 10-13), and/or increased cracking capacity in general (Specification, page 13, starting at line 17), and/or energetic advantages (Specification, page 14, lines 5-7), and/or improved selectivity (Specification, page 14, lines 16-19). In addition, the Specification describes a simulation illustrated in Example 1 on page 22 of the Specification, in which a cracking furnace as claimed is compared with a cracking furnace according to prior art under similar conditions. The claimed cracking furnace showed an improved heat flux profile along a length of the cracking coil, a higher process temperature along the coil, and an improved temperature distribution of the tube wall along the coil. An advantage or effect according to an aspect of Applicant's invention as

claimed in claim 8 is a desirable thermal profile throughout the length of the coils, as described, for example, at Specification, page 15, lines 8-14 and as illustrated in Figs. 3A and 3B.

Claim 1 requires a method for cracking a hydrocarbon feed, the method comprising passing the feed through a cracking coil in a firebox, the coil comprising at least one outlet section and at least one inlet section, wherein the outlet section of the coil is more thermally shielded than the inlet section of the coil. Further, claim 8 requires a cracking furnace for a hydrocarbon feed, the furnace comprising a firebox comprising a plurality of cracking coils with outlet sections of the coils positioned in at least one lane and with inlet sections of the coils positioned in at least two lanes, wherein the at least one lane of outlet sections is located between the at least two lanes of inlet sections and the at least two lanes of inlet sections are located in between the at least two lanes of burners.

Brown discloses cracking hydrocarbons in furnace reactor tubes constructed of a temperature-resistant non-nickel containing material (Brown, Abstract).

Brown does not disclose or suggest cracking coil outlet section more thermally shielded than the inlet section of the coil, as required by claim 1. Further, Brown does not disclose or suggest that at least one lane of the outlet sections is located between the at least two lanes of inlet sections and the at least two lanes of inlet sections are located in between the at least two lanes of burners, as required by claim 8. The Office Action acknowledges that Brown does not disclose that the outlet section of the coil is more thermally shielded than the inlet section, as required by claim 1. However, the Office Action cites Bauer for such a feature.

Bauer discloses a pyrolysis heater comprising a processing coil with an insert to provide a radiation absorption surface (Bauer, claim 1), which insert may be positioned at the outlet of the coil (Bauer, claim 2). Bauer discloses that the insert is positioned inside the tubular coil.

Bauer does not disclose or suggest that the insert thermally shields the coil, as required by claim 1. In addition, Bauer does not disclose or suggest that the outlet section of the coil is more thermally shielded than the inlet section of said coil, as further required by claim 1. Further, Bauer does not disclose or suggest that the at least one lane of the outlet sections is located between the at least two lanes of inlet sections and the at least two lanes of inlet sections are located in between the at least two lanes of burners, as required by claim 8. Accordingly, even taken together in combination, Brown and Bauer do not disclose or suggest the recitations of claims 1 and 8.

Claims 2-7, 18 and 19 depend from claim 1 and claims 9-17 and 20 depend from claim 8. Therefore, claims 2-7 and 9-20 are patentably distinguishable over the cited art for at least the same reasons as their respective base claim.

Applicant notes with respect to the Michelson reference cited but not relied upon that Michelson does not disclose or suggest shielding any portion of the coil inside of the firebox (or radiant section).

New Claims 21 and 22


New claims 21 and 22 are added so as more fully to claim patentable aspects of Applicant's invention. New claims 21 and 22 are fully supported by Applicant's disclosure.

Claims 21 and 22 depend from claims 1 and 17, respectively, and are therefore patentably distinguishable over the cited art for similar reasons.

In view of the foregoing discussion, withdrawal of the rejection and allowance of the claims of the present application are respectfully requested.

Respectfully submitted,

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